

WASHING MACHINE COMPRISING A LAUNDRY TUB

[001] The invention relates to a washing machine comprising a laundry tub and a laundry driving system located therein, that can be driven from outside the tub by means of a disk-shaped drive element, wherein at least one of the facing surfaces of the tub and the drive element has a surface structure.

[002] Such a washing machine is known from EP 0 152 745 B1. Used therein as a disk-shaped drive element for a laundry drum is a pulley having a hub at the centre and a rim on the outside, and a transmission belt which obtains its drive energy from a drum drive motor runs on the outer surface thereof. The hub and the rim of the pulley are interconnected by spokes; at least three wider or five narrower spokes are provided.

[003] In addition, the washing machine contains a soap solution container as a container for the laundry. A laundry drum is mounted horizontally and rotatably in the soap solution container. This drum is drive by the pulley by means of a shaft. The rear wall of the soap solution container is folded in a meander shape, whereby spoke-shaped structures are formed which help to stabilise the rear wall. In other known washing machines in which the soap solution container is made of sheet steel, the rear wall structure is formed by a spider of cast steel which forms a surface structuring similar to that in the washing machine according to EP 0 152 745 B1.

[004] In washing machines whose laundry drums are driven at very high speeds during the spinning process, e.g. at speeds beyond 1600 rpm, the structures of the facing surfaces of the driving disk and the rear wall of the container which brush past one another, together with the air located therebetween, produce an organ-like noise which can be very disturbing.

[005] It is the object of the invention to construct washing machines of the type specified initially so that as far as possible these perturbing noises cannot be produced.

[006] This object is solved according to the invention by the characterising part of claim 1 in a manner such that at least one of the two faces is provided with a cover which homogenises the

surface structure. As a result, the structures are decoupled from one another so that such perturbing noise can no longer occur.

[007] According to a particularly advantageous embodiment of the invention, in a washing  
 5 machine comprising a pulley serving as a drive element comprising a rim which guides the  
 belt and a number of spokes which connect a hub to the rim, the spokes are provided with a  
 flat cover. As a result, the structuring of the surface facing the soap solution container,  
 provided by the spokes, is covered with a uniform face which no longer causes any air  
 vibrations during rotation of the pulley which together with the structure of the soap solution  
 10 container rear wall, could build up to an audible air sound vibration.

[008] A similar effect would be obtained by another advantageous embodiment of the  
 invention in a washing machine comprising a soap solution container made of plastic which  
 serves as the tub, whose base facing the drive element is formed as a surface-structured face  
 15 such that spoke-like reinforcements of the base are obtained from a meander-shaped folding  
 of the base wall if, in this washing machine, the reinforcements are provided with a flat cover.

[009] In all these cases, the cover can advantageously consist of a film, in particular a highly  
 flexible plastic film.

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[010] In this case, the film can advantageously fixed by means of mechanical means to the  
 drive element or the base. For example, a clamping ring for the film which can be affixed to  
 the circumference by means of detent mechanisms can be provided. This would have the  
 advantage that the film can easily be exchanged.

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[011] However, the film can also be stuck to the furthest-protruding structural surfaces, e.g. to  
 the spokes of the pulley or to the reinforcements of the container rear wall, with the respective  
 structured surface.

30 [012] The invention is explained hereinafter with reference to an exemplary embodiment  
 shown in the drawings. In the figures:

[013] Figure 1 is a perspective view of the back of a washing machine soap-solution container with a pulley without using the measure according to the invention and

[014] Figure 2 is a partial section vertically through the rear part of a soap solution container  
5 according to Fig. 1 using the measure according to the invention.

[015] The exemplary embodiment shown relates to a washing machine comprising a plastic soap-solution container or tub 1 for receiving a horizontally mounted laundry drum 2 (Fig. 2). The rear wall 3 of the soap solution container has a meander-shaped structure so that spoke-  
10 like reinforcements 4 are obtained, leaving corresponding cavities 5 free between them.

[016] Located at a flat distance from the rear wall 3 (from the furthest-projecting faces of the reinforcements 4) is a pulley 6 which is connected rotationally fixedly to a star-shaped support 8 of the laundry drum 2 by means of a shaft 7. For this purpose the shaft 7 is mounted  
15 horizontally rotatably in the hub 9 of the soap-solution rear wall 3.

[017] The pulley 6 has a hub 10 which is connected rotationally fixedly to the shaft 7. The hub 10 is connected to the rim 11 of the pulley 6 by means of five spokes 12 which expose large intermediate spaces therebetween in the example shown. When the pulley 6 turns, the air  
20 masses entrained by the spokes impinge upon the structures of the soap solution container rear wall 3 and cause vibrations which cause an organ-like sound when rotating rapidly which can be disturbing. In addition, these vibrations cause alternating micro-loads on the structural elements concerned to a large extent which can develop into an overall harmful stress on the structural elements.

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[018] In order to avoid disturbing noises and permanent stress on the structural elements, according to the exemplary embodiment of the invention shown here a flat cover of the respective structures is attached at least to one of the facing surfaces of the tub 1 and the drive element 6. For this purpose, a thin e.g. film-like cover 13 is applied to the side of the pulley 6  
30 facing the soap solution container 1. This cover will possibly be sufficient to avoid the feared disturbances. Instead of this cover, a single cover 14 of the rear wall 3 of the soap solution container 1 may well be sufficient. However, if one of the covers is not sufficient, both covers

13 and 14 can also be used so that there are no discontinuities of the surfaces brushed by the entrained air.

[019] The covers can be attached in various ways. The simplest method of attachment can be  
5 achieved by gluing. However, purely mechanical types of application (screwing, detect  
mechanisms, plugging) are also feasible whereby, among other things, it is possible to  
exchange the covers.

[020]